**Remarks/Arguments**

Claims 3 and 4 have been withdrawn without prejudice to the filing of a divisional application, leaving claims 1-2 and 5-10 currently pending in the application.

Claim Objections

Claim 1 is amended to remove the colon after "with" and to insert "a" as proposed by the Examiner.

Claim 9 is amended so that the objected to language has been amended to say "delivery of **a** hairpin RNA **sequence"**.

**Claim Rejections under –35U.S.C. 112**

Claims 1, 2, 5 and 8 were rejected under Paragraph 2 as being indefinite.

Claim 1 is said to contain numerous clarity issues. Applicants have extensively amended claim 1 to make it more clear and definite and to overcome the issues raised by the Examiner. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

Claim 2 is rejected for being indefinite because it appears to the Examiner to claim Cytoplasmic Inhibition. Applicants have amended claim 2 to claim "A process of producing…". Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

Claim 5 is objected to for failing to state a positive step for determining nuclear gene function. Claim 5 has been amended to state a positive step. Accordingly, Applicants respectfully request reconsideration and withdrawal of this objection.

Claim 8 is objected to as containing indefinite terms. Claim 8 is now amended to remove the indefinite terms. Accordingly, Applicants respectfully request reconsideration and withdrawal of this objection.

REJECTIONS UNDER 35 U.S.C. 112, 1ST PARAGRAPH

Claims 1, 2, and 5-10 were rejected under 35 U.S.C. 112 1st paragraph as failing to comply with the written description requirement. The Examiner concluded that a skilled artisan would not have viewed the teachings of the specification as sufficient to show that the applicant was in possession of the claimed genus other than hairpin silencing sequences in plants. The ground for this rejection is that the claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s) at the time the application was filed had possession of the claimed invention.

This rejection is respectfully traversed. The Examiner appears to argue that the claims lack adequate support in the examples. This is not the standard for a rejection on the basis of written description under 112. In this regard, the MPEP also states at **2163 1.**: While a broad stroke rejection might work in some instances, a closer analysis must be applied to original claims.

> See *In re Koller*, 613 F.2d 819, 204 USPQ 702 (CCPA 1980) (original claims constitute their own description); accord *In re Gardner*, 475 F.2d 1389, 177 USPQ 396 (CCPA 1973); *accord In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). It is now well accepted that a satisfactory description may be **in the claims** or any other portion of the originally filed specification.
>
> A question as to whether a specification provides an adequate written description may arise in the context of an original claim which is not described sufficiently (see, e.g., >*LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1345, 76 USPQ2d 1724, 1733 (Fed. Cir. 2005);< Enzo Biochem, 323 F.3d at 968, 63 USPQ2d at 1616 (Fed. Cir. 2002); *Eli Lilly*, 119 F.3d 1559, 43 USPQ2d 1398).

**2163 Guidelines for the Examination of Patent Applications Under the 35 U.S.C. - 2100 Patentability**

**2163 1. A. Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, para. 1, "Written Description" Requirement [R-5]**

A. **Original Claims**

There is a strong presumption that an adequate written description of the claimed invention is present when the application is filed. *In re Wertheim*, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976) ("we are of the opinion that the PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims"). However, as discussed in paragraph I., *supra*, the issue of a lack of adequate written description may arise even for an original claim when an aspect of the claimed invention has not been described with sufficient particularity such that one skilled in the art would recognize that the applicant had possession of the claimed invention. The claimed invention as a whole may not be adequately described if the claims require an essential or critical feature which is not adequately described in the specification and which is not conventional in the art or known to one of ordinary skill in the art. For example, consider the claim "A gene comprising SEQ ID NO:1." A determination of what the claim as a whole covers may result in a conclusion that specific structures such as a promoter, a coding region, or other elements are included. Although all genes encompassed by this claim share the characteristic of comprising SEQ ID NO:1, there may be insufficient description of those specific structures (e.g., promoters, enhancers, coding regions, and other regulatory elements) which are also included.

The claimed invention as a whole may not be adequately described where an invention is described solely in terms of a method of its making coupled with its function and there is no described or art-recognized correlation or relationship between the structure of the invention and its function. A biomolecule sequence described only by a functional characteristic, without any known or disclosed correlation between that function and the structure of the sequence, normally is not a sufficient identifying characteristic for written description purposes, even when accompanied by a method of obtaining the claimed sequence. For example, even though a genetic code table would correlate a known amino acid sequence with a genus of coding nucleic acids, the same table cannot predict the native, naturally occurring nucleic acid sequence of a naturally occurring mRNA or its corresponding cDNA. Cf. *In re Bell*, 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993), and *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995) (holding that a process could not render the product of that process obvious under 35 U.S.C. 103). The Federal Circuit has pointed out that under United States law, a description that does not render a claimed invention obvious cannot sufficiently describe the invention for the purposes of the written description requirement of 35 U.S.C. 112. *Eli Lilly*, 119 F.3d at 1567, 43 USPQ2d at 1405. Compare *Fonar Corp. v. General Electric Co.*, 107 F.3d 1543, 1549, 41 USPQ2d 1801, 1805 (Fed. Cir. 1997) ("As a general rule, where software constitutes part of a best mode of carrying out an invention, description of such a best mode is satisfied by a disclosure of the functions of the software. This is because, normally, writing code for such software is within the skill of the art, not requiring undue experimentation, once its functions have been

disclosed. * * * Thus, flow charts or source code listings are not a requirement for adequately disclosing the functions of software.").
A lack of adequate written description issue also arises if the knowledge and level of skill in the art would not permit one skilled in the art to immediately envisage the product claimed from the disclosed process. See, e.g., *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1571, 39 USPQ2d 1895, 1905 (Fed. Cir. 1996) (a "laundry list" disclosure of every possible moiety does not constitute a written description of every species in a genus because it would not "reasonably lead" those skilled in the art to any particular species); *In re Ruschig*, 379 F.2d 990, 995, 154 USPQ 118, 123 (CCPA 1967) ("*If* n-propylamine had been used in making the compound instead of n-butylamine, the compound of claim 13 would have resulted. Appellants submit to us, as they did to the board, an imaginary specific example patterned on specific example 6 by which the above butyl compound is made so that we can see what a simple change would have resulted in a specific supporting disclosure being present in the present specification. The trouble is that there is no such disclosure, easy though it is to imagine it.") (emphasis in original); *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1328, 56 USPQ2d 1481, 1487 (Fed. Cir. 2000) ("the specification does not clearly disclose to the skilled artisan that the inventors ... considered the ratio... to be part of their invention .... There is therefore no force to Purdue's argument that the written description requirement was satisfied because the disclosure revealed a broad invention from which the [later-filed] claims carved out a patentable portion").

Under the In re Koller line of cases, the Examiner must include in the written description analysis the scope of the originally-filed claims to determine the scope of the invention that the Applicants were in possession of. This would indicate that the examples cannot always be used to reject the claims on the basis of written description.

Further, the Examiner argues that a skilled artisan would not have viewed the teachings of the specification as sufficient to show that the applicant was in possession of the claimed genus other than hairpin silencing sequences in plants. In view of the present amendments to the claims, this rejection is would appear to be moot.

Accordingly, applicants respectfully request that the Examiner withdraw this ground of rejection or modify the rejection based on an analysis that includes the scope of original claims as part of the written description and by following the guidelines in MPEP 2163 II.A. The MPEP is likely to be more up to date than the January 5, 2001 Federal Register.

Further, the case law cited in the MPEP probably represents a more correct line of analysis than the cases cited by the Examiner.

Claims 1,2, and 5-10 were rejected under 35 U.S.C. 112, 1st paragraph for lack of enablement with respect to the scope of the claims. The Examiner does not stop there, but refers to 1) a genus of viruses, 2) a genus of hairpin structures and 3) a limited number of target genes exemplified. In view of the amendments to the claims restricting the host, this rejection is respectfully traversed. The inclusion of "plant" as a modifier to "host" limits the virus to a virus capable of function in a plant. The test set forth in the MPEP and quoted below states "**The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation.**" "**A patent need not teach, and preferably omits, what is well known in the art without undue experimentation**."

**2164.01 Test of Enablement [R-5]** states in part:

> Any analysis of whether a particular claim is supported by the disclosure in an application requires a determination of whether that disclosure, when filed, contained sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the claimed invention.
>
> The standard for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision of *Mineral Separation v. Hyde,* 242 U.S. 261, 270 (1916) which postured the question: is the experimentation needed to practice the invention undue or unreasonable? That standard is still the one to be applied. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). Accordingly, even though the statute does not use the term "undue experimentation," it has been interpreted to require that the claimed invention be enabled so that any person skilled in the art can make and use the invention without undue experimentation. *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404 (Fed. Cir. 1988). See also *United States v. Telectronics, Inc.,* 857 F.2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988)
>
> **"The test of enablement is whether one reasonably skilled in the art could**

a) **make or use the invention from the disclosures in the patent coupled with**
b) **information known in the art**
c) **without undue experimentation.")**
d) **A patent need not teach, and preferably omits, what is well known in the art**. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947 (1987); and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984). Any part of the specification can support an enabling disclosure, even a background section that discusses, or even disparages, the subject matter disclosed therein. *Callicrate v. Wadsworth Mfg., Inc.*, 427 F.3d 1361, 77 USPQ2d 1041 (Fed. Cir. 2005).

1) A GENUS OF VIRUSES

By merely counting examples, the Examiner has overlooked the breadth of enablement that has been shown by the examples. The exemplary plant viruses are so diverse in their evolution that they span across both monocotyledonous and dicotyledonous hosts, yet they are still capable of silencing genes by expression of hairpin structures in accordance with the invention without further modification of the invention. A legal analysis of patentability would appear to require more than counting numbers of examples. For example, would further experimentation be required to cross diverse evolutionary lines? It would seem that the examples are sufficient.

2) A GENUS OF HAIRPIN STRUCTURES

Applicants have shown that the exemplified hairpin structures of this invention, expressed by a virus in the cell cytoplasm will inhibit gene expression in the nucleus of a host cell even though the exemplified viruses are so evolutionarily diverse as to infect either monocotyledonous or dicotyledonous plants. It would appear that the hairpin structures are

functional to meet the claimed invention within the broadest example possible, to cross over viruses that are so diverse that some infect monocotyledonous plants while others infect dicotyledonous plants. Certainly a presumption that nature is unpredictable can be overcome by a diverse set of examples.

3) A LIMITED NUMBER OF TARGET GENES EXEMPLIFIED.

The number of exemplified genes would appear to be a red herring. The point is, a hairpin of the claimed invention can inhibit a gene expressed by a host that is cytoplasmically infected by a viral vector of the claimed invention.

For these reasons, Applicants respectfully request that this rejection be withdrawn or modified.

Claim 1 was rejected under 35 U.S. C. 102(b) as being anticipated by Symonds et al. U.S. 5,712,384. Symonds et al is said to teach a transfer vector comprising RNA which gives rise to a hairpin structure and which targets HIV integrated into the host genome. This rejection is respectfully traversed.

Symonds et al teach a virus that infects an animal host, not a plant host. There is nothing in this reference that could reasonably be said to anticipate or even suggest the presently claimed invention. Accordingly, Applicants respectfully request reconsideration and withdrawal of this ground of rejection.

Claims 1,2 and 5-8 were 4rejected under 35 U.S.C. 103(a) as being unpatentable over Graham (U.S. 6,573,099 B2) in view of Scholthof et al. (Ann Rev Phytopath. 1996: 34 pp299-323.). This rejection is respectfully traversed.

Graham et al is said to teach a palindrome of 20-30 nucleotides where the target gene is endogenous to cell, tissue or organ, and that the synthetic genes may be introduced into a

suitable cell as virus particle or virus vector. Scholthof et al. is said to teach TMV and BSMV as viral vectors.

The Examiner at first appears to make out a prima facie case for obviousness. However, while Graham teaches something about making and using a palindrome within an animal virus, Scholthof et al., is a review of transient expression of foreign genes by plant virus gene vectors. Neither of these references appears to be in any way connected. To make out a valid obviousness rejection, at least one of these references must contain a motivation to combine it with the other reference.

The Examiner states only that Graham does not teach the teach TMV and BSMV, but Scholthof et al. does teach TMV and BSMV. There appears to be nothing in either reference that would motivate one skilled in the art to combine them. Further, they do not appear to have any discussions in common. Specifically, Applicants could not find a discussion of hairpins or palindromes in Scholthof et al. It appears only that in hindsight the Examiner has found it convenient to combine the present specification with the references to set up a ground of rejection. This is not legally possible. A person skilled in the animal virus art would not look to a reference that merely contains a list of plant viruses and declare that an invention that can be applied to the interaction between an animal virus and an animal host would also apply to plants and their viruses. There was no teaching in the art a the time this invention was made that would provide a motive to do so. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

Claims 1, 2, 5, 8-10 were rejected under 35 U.S.C. 103(a) as being obvious over Graham in view of Kovacs et al. 7,034,141. This rejection is respectfully traversed.

Claim 9 as amended refers to a plant cell. Claim 10 as amended refers only to plant viruses. Accordingly, Applicants respectfully request reconsideration and withdrawal of this ground of rejection.

Applicants respectfully petition for a two month extension of time under the provisions of 37 CFR 1.136(a) for sufficient time to accept this response. The commissioner hereby is authorized to charge payment of any fees under 37 CFR § 1.17, which may become due in connection with the instant application or credit any overpayment to Deposit Account No.500933.

Respectfully submitted,
/Thomas Gallegos/
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Date: January 8, 2007

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